

Training material on the
subject of incidental
catches of marine
mammals in the Bay of
Biscay



**CETAM
BICION**





Document outline

- Marine mammals in the Bay of Biscay and the Iberian coast
- Interactions between marine mammals and fishing activities and associated risks
- What solutions or practices should be adopted to deal with bycatch?
- Inventory of ongoing projects and initiatives by professionals to reduce catches in the Bay of Biscay

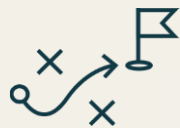


Context

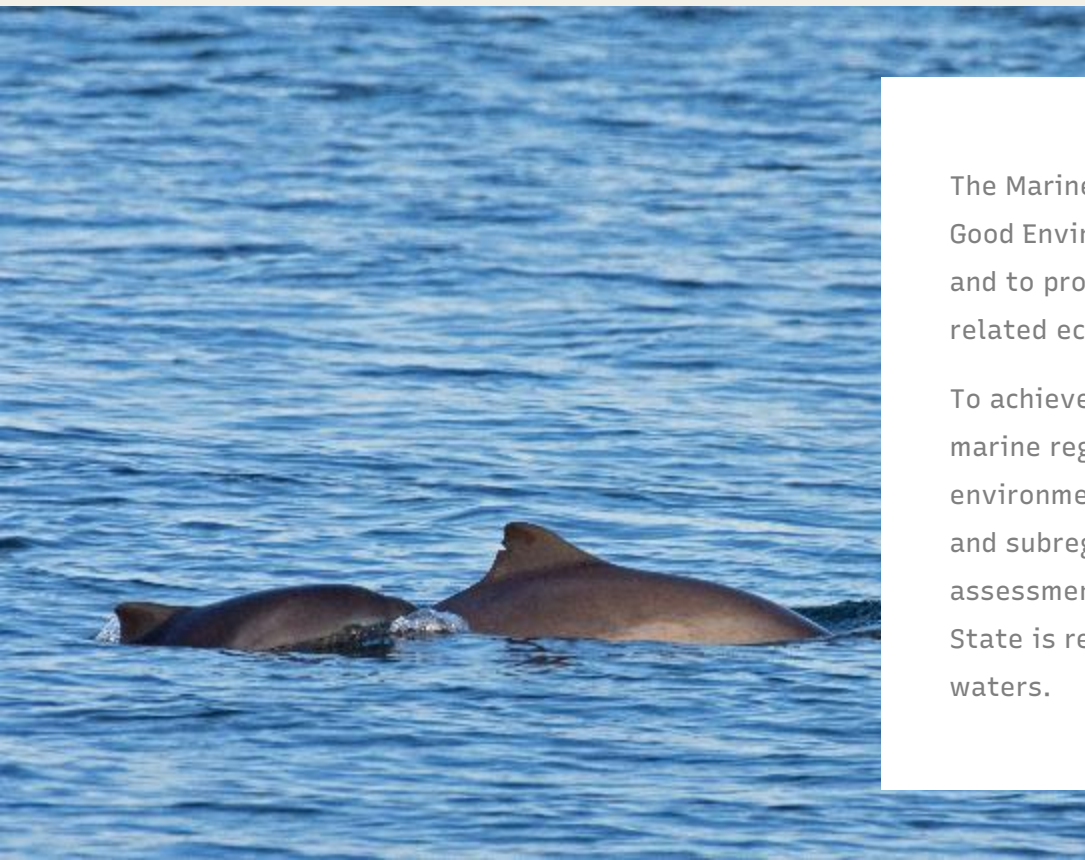
The CetAMBICion project seeks to respond to the urgent need to **reduce cetacean bycatch in EU fisheries**, in particular in the Bay of Biscay and the Iberian Coast where it is likely one of the greatest threats to the survival of these protected species.

This objective is aligned with the objectives of the **Marine Strategy Framework Directive (MSFD)**, the Habitats Directive, and the Common Fisheries Policy.





Marine Strategy



The Marine Strategy Framework Directive aims to achieve Good Environmental Status (GES) of the EU's marine waters and to protect the resources based upon which marine-related economic and social activities depend.

To achieve its goal, the Directive establishes European marine regions and sub-regions based on geographical and environmental criteria. Cooperation among these regions and subregions is required by the MSFD to carry out the assessments and to obtain GES. Moreover, each Member State is required to develop a strategy for its marine waters.



The CetAMBICion project, coordinated by the Spanish National Research Council (CSIC) and which includes 15 partners from Spain, France and Portugal, aims to strengthen collaboration and scientific work between the three countries to estimate and reduce cetacean bycatch in the subregion Bay of Biscay and Iberian Coast, in close collaboration with the fishing industry.

The CetAMBICion project is a first step towards **achieving a coordinated regional assessment of Good Environmental Status (GES)** for cetaceans in the subregion Bay of Biscay and Iberian Coast.

Objective



Implementation period

2021

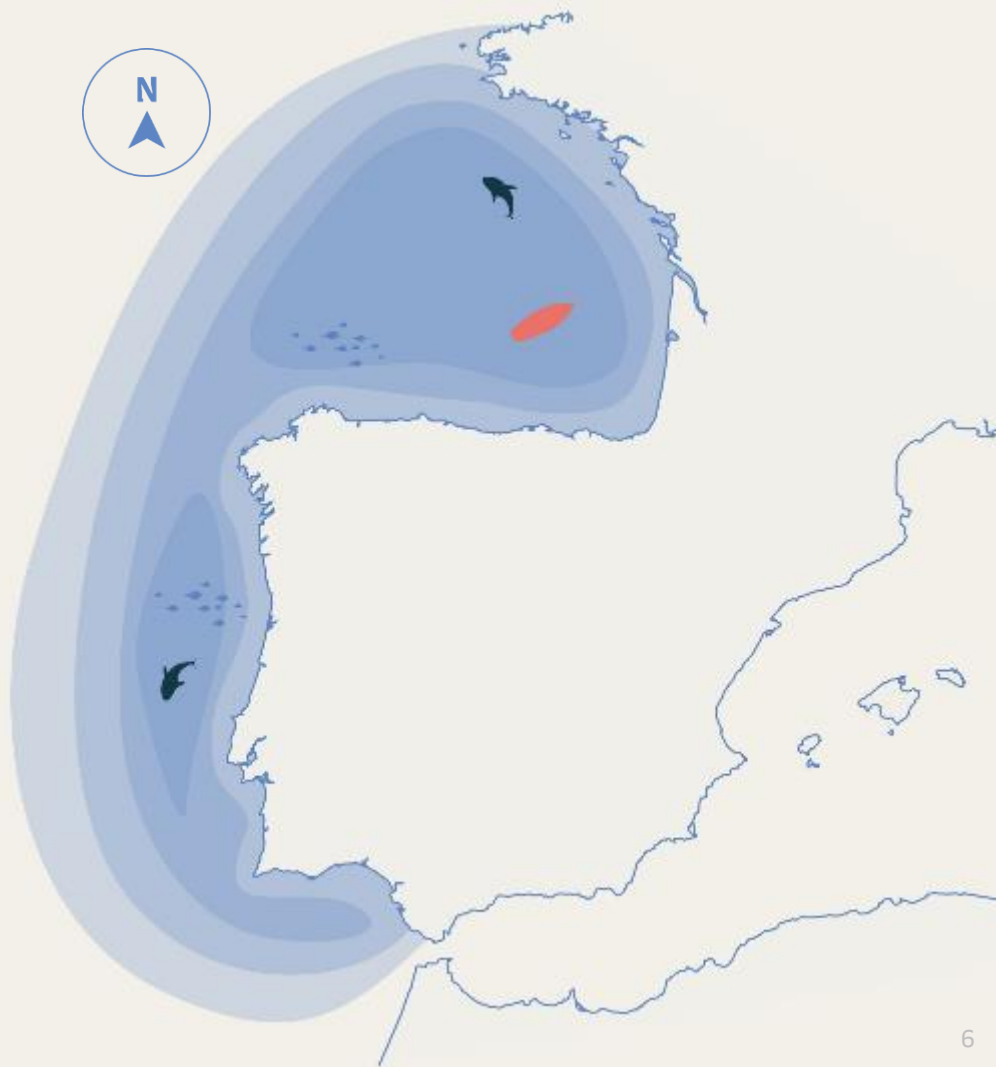
2022

2023



Area of action

Coordination between France, Portugal and Spain is one of the core values of the project.

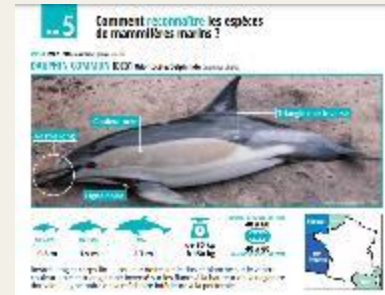
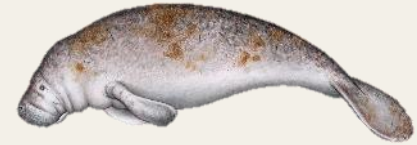




Marine mammals

How do you recognise a marine mammal?

- Breathes air at the surface through a vent → lungs
- Lives in the water → fins (for cetaceans the caudal fin is horizontal whereas in fish it is vertical)
- Internally pregnant and suckles her young → udders
- There are several different groups of marine mammals:
 - *Cetaceans* (whales, dolphins, porpoises, etc.)
 - *Pinnipeds* (seals, sea lions, walrus, ...)
 - *Sirenians* (manatees and dugongs)
- The guide to reporting incidental catches lists these species with identification keys to help recognise them





Marine mammals in the Bay of Biscay

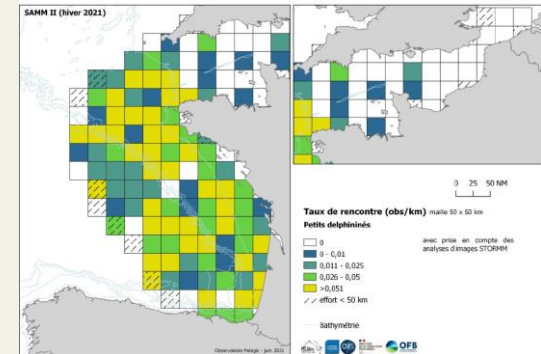
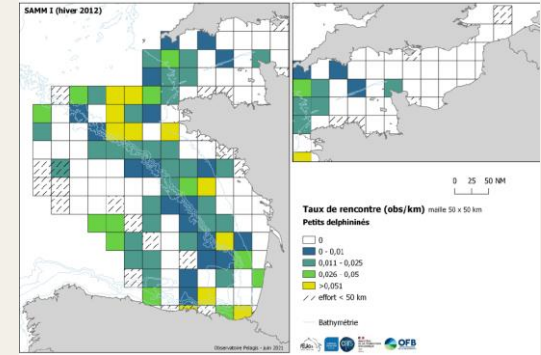
- Inventory and scientific monitoring of marine species (distribution/abundance) via aerial overflights, campaigns at sea, acoustic monitoring, photo-identification, strandings
- 14 species of cetaceans + 1 species of seal* are permanent visitors to the Bay of Biscay and 8 species can be observed occasionally
- The distribution of species is changing over time: common dolphins in particular are dividing into smaller groups and moving closer to the coast in recent years

* 2 *whales* (minke and fin whales)

6 *dolphins* (bottlenose dolphin, common dolphin, striped dolphin, Risso's dolphin, pilot whale, harbour porpoise)

5 *toothed whales* (killer whale, sperm whale, pygmy sperm whale, beaked whale, Sowerby's beaked whale)

1 *seal* (grey seal)



Encounter rate of common dolphins by aerial surveys in winter 2012 (*top*) and winter 2021 (*bottom*)

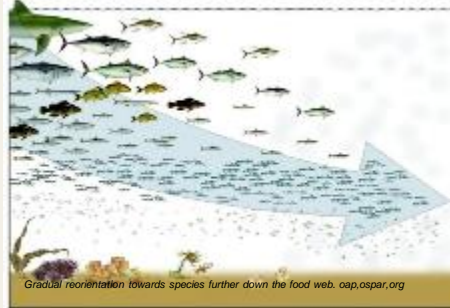
Campaign report: Blanchard A., Dorémus G., Laran S., Nivière M., Sanchez T., Spitz J. and Van Canneyt O. (2021). Distribution and abundance of marine megafauna in mainland France. Report of the SAMM II Atlantic-Channel campaign - Winter 2021, by the Pelagis Observatory (UMS 3462, La Rochelle University / CNRS) for the Direction de l'Eau et de la Biodiversité and the Office Français de la Biodiversité. 103 pp.



Interactions between marine mammals and fishing activities

Why are there captures?

- Same fishing area or target species = **trophic competition**
- Attracting dolphins near fishing boats = **depredation**
- **Lack of visibility/selectivity** of some fishing gear that accidentally catches non-target animals



The disappearance of large predators has a wider impact on the environment and marine resources

The consequences

- **1st cause of species decline** with over 600,000 marine mammals accidentally captured each year worldwide
- Dolphins are **super predators** at the top of the food chain. They play a **regulatory role** in marine ecosystems

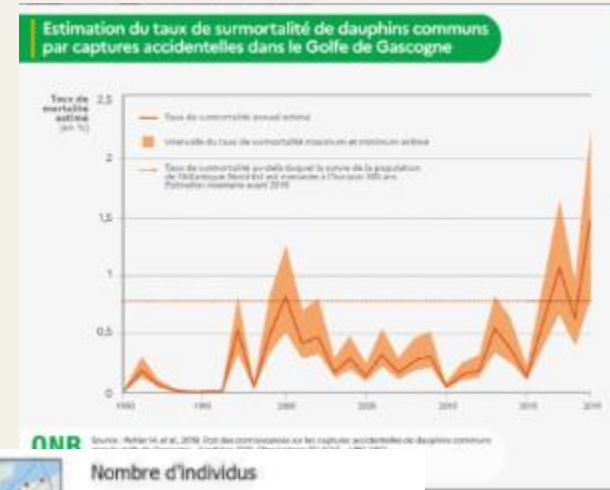




Situation in the Bay of Biscay

The Situation in the Bay of Biscay

- **Significant increase in** strandings on the Atlantic coast since 2016
- **Generalised situation** on the whole coastline and in all countries (France, Spain and Portugal)
- **Traces of accidental capture** were noted in 60 to 80% of cases for certain stranded species (common dolphins and harbour porpoises in particular)



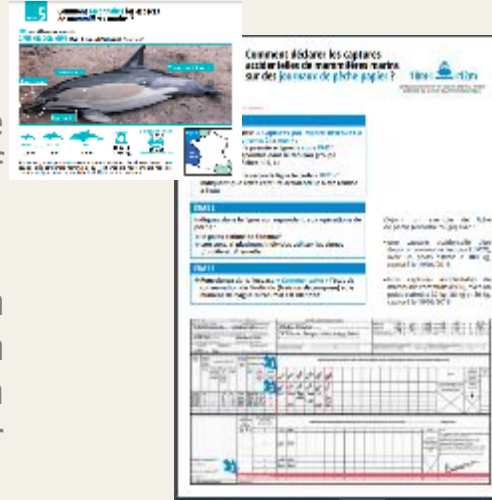


Transmission of information on incidental catches

Why do we need to pass on this information?

- Better understanding of the reasons for and context of incidental catches
- Knowing when to intervene in fishing operations, with which fishing gear and how (modification of gear, strategies, techniques or areas)

→ in the face of a risk of generalised closure, this knowledge would make it possible to avoid penalising the entire sector by targeting only the gear/area/period or practice at risk

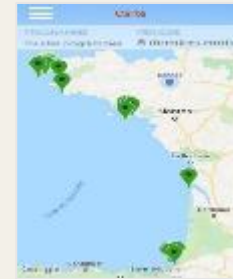


Additional data

- Participatory science mobile applications (not mandatory)

Collection of robust fisheries data

- Since 01/01/2019, mandatory declaration of marine mammal catches on logbooks.
- A guide exists in France to help professionals declare them





Possible solutions to the accidental capture of marine mammals

<u>Improving the visibility of fishing gear</u>	<u>Modification of fishing gear</u>	<u>Changes in fishing practices</u>	<u>Fishing effort limitation and management</u>	<u>Regulatory and incentive measures</u>
Active or passive acoustic repellent	Modification of the nets	Alternative fishing gear	Time and space closure	Regulation
Acoustic reflectors	Trawl exclusion system	Duration and period of immersion of the fishing gear	Area closure based on reaching a catch limit	Monitoring and surveillance
Informative warning signal	"Intelligent" fishing gear	Depth of the fishing gear	"Move-on" rule	Economic levers
Change of net colour		Adoption of good practice	Predictive fisheries management	
Lighting of nets				

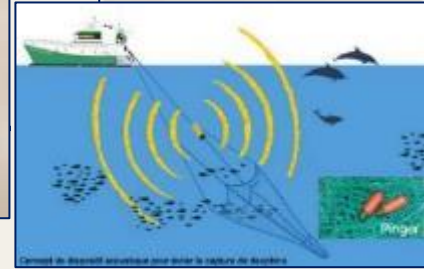




Improving the visibility of fishing gear - Acoustic deterrents

Presentation

- ✓ Informs marine mammals of the presence of gear
- ✓ Many models exist, active or passive, which adapt to the frequencies of the species with more or less intense signals depending on the type of interaction
- ✓ Most common catch-reduction method with many models



Canal de Brest: dispositif acoustique pour éviter la capture de dauphins

Existing regulations

- **USA** : Harbour Porpoise & Bottlenose Dolphin Take Reduction Plans
- **Europe**: mandatory on French pelagic trawlers since 2019 (DDD03), in Spain on beef bottom trawlers, in the Netherlands (summer), in Germany, in the UK (+12m), ...

Ongoing projects

- Tested in many fisheries around the world (Australia, South Africa, Japan, Peru, ..)
- **Europe**: numerous tests on nets to limit captures of harbour porpoises, common dolphins and bottlenose dolphins (France, Spain, Portugal, Italy, Denmark, Germany, UK, Iceland, ...)





Improving the visibility of fishing gear - Acoustic deterrents

Benefits

- Significant bycatch reduction rates (e.g. harbour porpoise)
- Do not affect catch yields or fishing practices
- Numerous studies and scientific results available
- Many brands and models on the market

Disadvantages

- Its effectiveness depends on the species, their behaviour, the fleets and the environment (contrasting results for common and bottlenose dolphins)
- Reduces but does not completely eliminate catch
- May have attraction, habituation or exclusion effects on species
- Need to maintain and recharge equipment to ensure its effectiveness
- For large fishing gears, can require a lot of human time and investment

Bay of Biscay

- Regulations already in place for pelagic trawlers (DDD03) = 65% reduction in common dolphin catches
- Ongoing projects for nets (LICADO, Pifil, DolphinFREE, Pechdauphir)





Improving the visibility of fishing gear - Acoustic reflectors

Presentation

- ✓ Passive solution: incorporation of high acoustic reflectivity material into nets to make them more detectable when a cetacean is nearby and use echolocation
- ✓ Different materials can be used



Past and current projects

Glass or plastic bottles → tested in Peru and Kenya

Barium sulphate → in USA, UK, Portugal

Iron oxides → North Sea, Argentina

Acrylic beads → Stella project in the Baltic and Black Seas (tests in progress)

Polyester yarn → LICADO project in the gdg (tests in progress)

Reflective buoys (RAP) → RU (tests in progress)

No known application in the regulation





Improving the visibility of fishing gear - Acoustic reflectors

Benefits

- No risk of habituation or noise pollution
- Low cost and no special maintenance costs
- Little impact on fishing techniques and performance (acrylic beads and polyester filament)
- Detectable by harbour porpoise (acrylic beads) and common dolphin (polyester filament and PAR)

Disadvantages

- Only works if cetaceans are using echolocation
- Reduced yield of target species
- Difficulty in handling the net seems more rigid
- Can be time consuming to install initially (acrylic beads)



Bay of Biscay

The tests carried out in the **LICADO, Stella and UK** projects **are interesting** and should be followed closely but there is still a lot to be done:

- Lack of data to assess its effectiveness on the species concerned
- Lack of knowledge about the performance of target species and ease of use in different fisheries



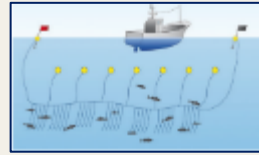


Improving the visibility of fishing gear - Lighting of nets



Presentation

- ✓ Installation of LEDs on fishing gear
- ✓ Different colours can be used depending on the species
- ✓ Also works for other species (birds, turtles)



Ongoing projects

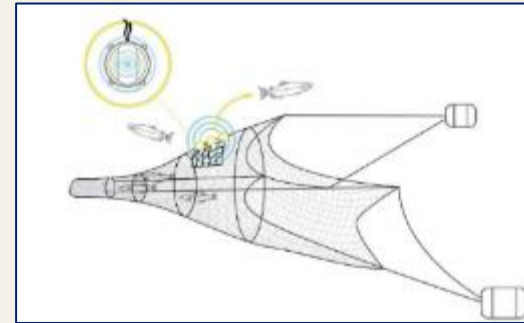
Nets → LEDs installed on bottom nets and wedged

Peru for cetaceans (+), Baltic Sea for birds (-) but next tests planned in 2022, UK (ongoing, with pingers), Adriatic Sea (ongoing)

Trawls → LED flash in trawls

Tests in the Adriatic Sea (in progress)

No known application in the regulation





Improving the visibility of fishing gear - Lighting of nets

Benefits

- Would work on small cetaceans and could reduce further bycatch
- Little effect on target catches
- Inexpensive (for small machines)
- Possible alternative energies for recharging

Disadvantages

- Its effectiveness depends on the species
- May lead to further bycatch or different response from target species
- Can be expensive for large machines
- Time consuming to install and recharge
- Waste generated by the loss of LEDs



Bay of Biscay

The tests carried out in the **Life Delfi and Clean Catch UK** projects are interesting as they concern the same species as in the gdg, however :

- Its efficiency depends on the environment in which the LEDs are installed (depth, turbidity) and must be adapted to the species and environment (LED colour, light intensity, number of LEDs per gear)
- An economic study should also be carried out to evaluate the investment and maintenance costs (including human time)





Improving the visibility of fishing gear - Other possibilities

Past or ongoing experimental projects

✓ Changing the colour of the nets

Studies conducted in Australia on bottlenose dolphins between grey and green nets → many biases in the protocol, so no reliable results

✓ Informative warning signs

DolphinFREE project in the common dolphin gdg 2021/2022





Modification of fishing gear - Nets

Presentation

✓ Lower the net 2-4 m below the surface

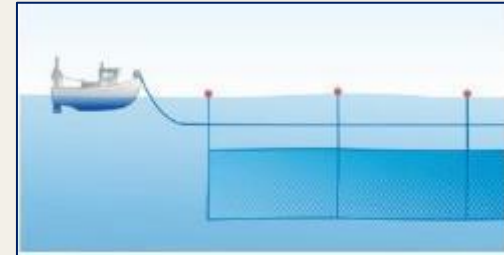
Ongoing projects

Studies in Pakistan (drift net under 2m)

Australia (-4.5m)

Guyana Fr

No known application in the regulation



Benefits

- Seems to work for small cetaceans
- Inexpensive and easy to set up

Disadvantages

- May affect the yield of target species



Bay of Biscay

The target species are often demersal
There are no nets that reach the surface and no drift nets

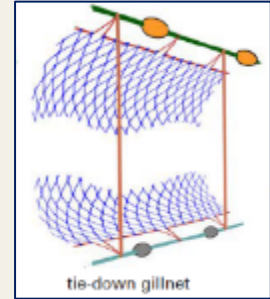
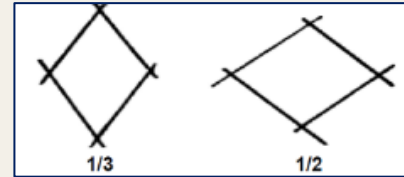




Modification of fishing gear - Nets

Presentation

- ✓ **Increase the tension of the net (limit the capacity for entanglement)**
 - ✓ Via the buoyancy of the top luff tape
 - ✓ By changing the hanging ratio
- ✓ **Decrease the vertical profile**
 - ✓ By adding tie-downs



Projects and/or regulations

Floatability of the top luff line → removing floats ↑ catching **harbour porpoise**.

Hanging-ratio → in the Gulf of Maine, **harbour porpoise** catch is stable but target species decreasing

Tie-down → ↓ of common dolphin and harbour porpoise in burbot bottom nets in the USA

The Harbour Porpoise Take Reduction Plan requires the use of tie-downs for large-mesh nets in areas and periods of critical harbour porpoise and dolphin catches

Few studies have worked on this type of reduction





Modification of fishing gear - Nets

Benefits

- Does not require fishers to change their practices or jobs
- Low cost
- For tie-downs: seems to work for small cetaceans, has no impact on target species

Disadvantages

- Modifying a fishing gear can reduce its efficiency (vertical profile, hanging ratio, entanglement capacity)
- Difficulty in determining the right combination of target species yield and catch limits for large marine vertebrates



Bay of Biscay

Tie-downs seem to work (in addition to other measures) in the USA for the species concerned in the gdg:

- According to Cloatre (2020), their use in French fleets is not relevant because the nets already have a low vertical profile
- Study their feasibility in Spain or Portugal





Modification of fishing gear - Other possibilities

Past or ongoing experimental projects

✓ Smaller thread diameter

Tested in Spain and the UK

→ would only work for large cetaceans such as bottlenose dolphins

→ thinner nets would be less detectable in the water

→ economic cost associated with damaged nets

✓ Brittle links

Developed for large mysticetes (right whales) in Canada for traps and nets, many projects underway

→ **Atlantic Large Whale Take Reduction Plan** in the USA requires breakaway ropes for lobster traps

→ are not relevant in the Bay of Biscay context

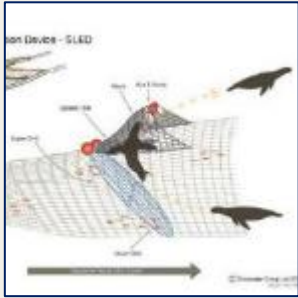




Modification of fishing gear - Trawls

Presentation

- ✓ **The Cetacean Excluder Device:** a grid installed in the trawl net to block incidental catches while allowing the target species to pass
- ✓ The distance between the bars of the grid and the angle of inclination must be adapted to each target species and accessory



Current regulations

Already used for turtles (TED and TTED) in the USA and on the Guyana Plateau in shrimp trawlers

→ **TED is required in the USA and required by the Marine Mammal Protection Act for the import of tropical shrimp into the USA, consideration being given to this in Europe**

Used for pinnipeds (SED) in trawls and pots (pontoon trap)

Ongoing projects

The CED has been tested in Italy (-) and will be tested in the framework of Cetambicion on bottom trawls in Spain (2022-2023)





Modification of fishing gear - Trawls

Benefits

- Does not require fishers to change their practices or jobs
- Low cost
- Is effective on turtles
- Appears to be effective on pinnipeds

Disadvantages

- Mixed results on common dolphins, bottlenose dolphins or certain species of pinnipeds: dolphins may try to escape through the mouth of the trawl or their caudal fin may remain blocked (bottlenose dolphin)
- May injure the animal resulting in post-capture mortality
- The Excluder Device scrapes the bottom and can impact benthic habitats



Bay of Biscay

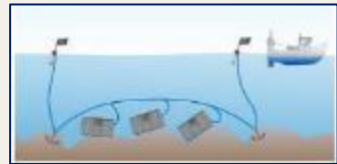
The **studies on cetaceans are not conclusive** but new studies (Spain) will provide more data on the feasibility of this type of measure:

- Must be filmed to better study the interaction
- The effectiveness of this measure also depends on the characteristics of the gear, its depth, speed, power, size and space available on the boat to use a grid
- Specific to each fishery



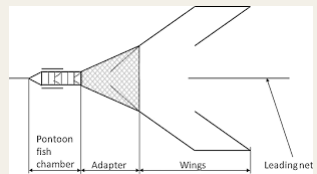
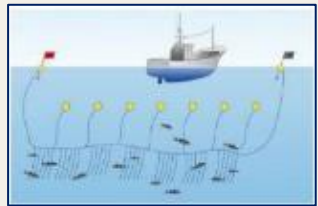


Changes in fishing practices - Alternative fishing gear



Presentation

- ✓ Can be used temporarily during risk periods or permanently
- ✓ The studies currently underway are **mainly** aimed at **replacing nets** and to a lesser extent trawls with :
 - ✓ Fish traps
 - ✓ The hook looms
 - ✓ Small non-sliding seine



Ongoing projects

Fish traps / pots → currently being tested in Northern Europe (Baltic Sea, Sweden, Norway, Scotland) to target cod, pollock and in the Adriatic Sea for dry fish

Seine → tests conducted in the Baltic Sea on small boats

Longlines → used to replace nets on demersal species in Sweden, Germany, Iceland, Australia, .

Rods → tests carried out in French Guiana Possibility of using jigging machines to increase fishing efficiency

Other methods exist such as pontoon traps





Changes in fishing practices - Alternative fishing gear

Benefits

- Traps and hook-and-line gear prevent cetaceans from being caught accidentally
- Can also be more selective on species and size
- Fish for live target species improving the quality of the catch and providing opportunities to access eco-labels

Disadvantages

- **Raises many other technical, environmental and administrative issues**
- Substantial drop in yield and machinery not adapted to all species
- May generate other impacts (on habitats, target or incidental catches, generate depredation)
- Spatial competition and risk of conflicts of use
- Configuration, power of boats sometimes not compatible and economic cost associated with gear changes and boat adaptation
- Crew skills
- Issuance of professional fishing licences



Bay of Biscay

Studies must be carried out on a case-by-case basis depending on the fleet, the species targeted, the vessels and crews.

Possibility to change gear only during the season at risk (already the case for several fleets).

Support to enhance the value of the catches and ensure the profitability of the new equipment as well as a technical and administrative feasibility study must be carried out.





Changes in fishing practices - Design and adoption of good practices

Presentation

- ✓ Progressive adoption of procedures to limit bycatch
- ✓ To be adapted to each fishery and each type of catch
- ✓ Requires monitoring by independent on-board observers

Ongoing :

Sliding Seine → Agreement on the International Dolphin Conservation Program which includes several techniques to be respected by the contracting parties (International Tuna Commission, Sardine Association)

Training and application of a protocol before fishing, Backdown procedure, dolphin safety panel, presence of observers, ...

Bottom trawl → Australia and New Zealand (grenadier) to reduce pinniped catches

Trolling speed of the gear, no discarding in the water, checking before launching, closing the gear when it is raised, not changing direction, stopping fishing if more than 5 animals around the boat, ...

Longline → TAAF

Prohibition to put lines in the water when sperm whales, pilot whales and killer whales are present and must remove their lines or increase speed if necessary

Nets → projects under consideration in the Adriatic Sea for bottlenose dolphins

First aid and fishers' training

Dolphin Release



- Dolphins will not jump out of the net
- Small mesh panels reduce entanglement
- Backdown procedure pulls net out from under dolphins
- Small boats hold net open and herd dolphins to submerged portion



Changes in fishing practices - Other existing solutions

Adoption of practices

✓ Immersion time of the gear

The duration of immersion influences the catches and their lethality but also the yield of the gear

✓ Restriction of day/night fishing

Small cetaceans are caught at night

→ The **Bottlenose Dolphin Take Reduction Plan** prohibits the setting of large mesh nets at night.

→ conversely, the TAAF must lay their lines at night to avoid depredation

✓ Fishing depth

Studies in Galicia have shown in 2010 a decrease in catches of common dolphins in pair trawls (whiting) in waters of + 250 m or even 300m.

→ demand for large boats and ↑ fuel consumption

→ **these measures alone are not sufficient to reduce catches**





Management of fishing effort

- ✓ Strict space-time closure
 - ✓ To some machines
 - ✓ Around more or less extensive functional areas

- ✓ Dynamic fisheries management
 - ✓ Zone closure when a "tolerable" catch limit is reached
 - ✓ Voluntary displacement of fishers from a catching site or a site at risk of catching
 - ✓ Predictive management

→ **require precise regulations adapted to the species/fisheries, support for the profession and adapted means of surveillance and control**





Management of fishing effort - Time and space closures

Benefits

- Completely eliminates bycatch in the area
- May have other ecosystem benefits in the area

Disadvantages

- Difficulty in determining the precise area and time of closure (especially for mobile species)
- May cause displacement of fishing effort in adjacent areas (countries)
- Not suitable if species' range changes
- High socio-economic impact



Bay of Biscay

ICES proposed 15 space-time closure scenarios at different time steps.

The entire Gulf would be closed (closing small areas would not work)





Management of fishing effort - Closures based on a catch limit

Current regulations

- **Gillnetters in Australia:** AFMA Dolphin Mitigation Strategy limit of 3 dolphins caught (1/210 000 metres)
- **Longliners in Hawaii:** limit of 2 leatherback turtles and 5 loggerheads (16 interactions for the entire fishery)
- **Longliners in South Africa:** limit of 25 birds (0.05 birds/1000 hooks)
- **Seine in the Inter American Tropical Tuna Commission:** cap of 0.1% of each stock
- **TAAF longliners:** 0.005 birds /1000 hooks / 100% observers

Benefits

- Eliminates catches above a "tolerable" mortality threshold
- Encourages fishers to adopt solutions
- More suitable for mobile species

Disadvantages

- Need for data to determine threshold limit
- Requires high observer/camera coverage

Bay of Biscay

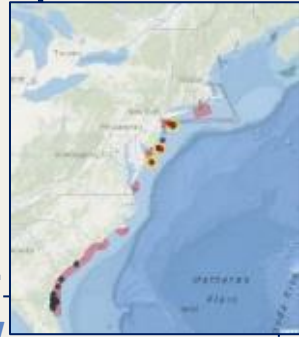
A threshold has been proposed by OSPAR but this threshold must then be broken down by fleet, trade, etc.

Insufficient current means of control





Management of fishing effort - Voluntary displacement of fishers or "move-on" rule



Current regulations

- **RFMO:** moving bottom gear to protect Vulnerable Marine Ecosystems
- **Bycatch management: implemented** in fisheries under quota with discard ban
- **Right whale measurements:** USA and Canada
- **Spain:** move trawls by 5 minutes from 3 cetaceans or 2 in successive fishing operations
- **TAAF:** relocation of fishing areas when large odontocetes are observed

Benefits

- Less impact on the profession than other closure measures

Disadvantages

- Requires a flexible and committed fleet
- Regulatory and/or economic incentives
- Strong observer coverage
- Ability to communicate in real time



Bay of Biscay

- Diversity of trades (mobile and dormant) complicates real-time movement
- Real-time communication tools
- The whole area should be closed Low observer coverage

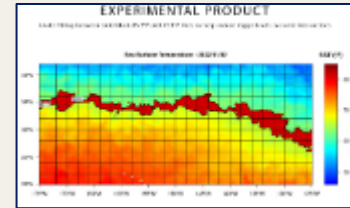
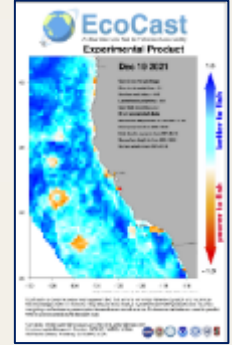




Management of fishing effort - Predictive management

Current projects

- **French Guiana:** detection of olive ridley turtle arribadas and warning of areas at risk in anticipation
- **Hawaii:** tool for predicting isotherms to avoid for loggerhead and leatherback turtle catches (Turtle Watch)
- **California and New Zealand:** development of predictive tools for leatherback turtle, sea lion and blue shark presence (Ecocast)



Benefits

- Prevents catches and area closure
- Tool for fishers

Disadvantages

- Strong knowledge of the species, the environment and the interactions with the fishing industry
- Requires a flexible fleet
- Wide observer coverage and monitoring system (VMS)

Bay of Biscay

- Not possible to predict a higher risk period with sufficient accuracy
- the entire area must be closed
- Too little observer coverage





Current projects in the Bay of Biscay

Projects involving fisheries professionals in France

- **LICADO**: testing Cetasaver pingers and acoustic reflectors in fishing nets
- **Pifil**: tests of Cetasaver pingers, positioned on the hull of the boat and activated only when the fishing nets are spun
- **DolphinFREE**: tests of pingers emitting an informative signal, understandable and interpretable by dolphins, and generating energy to increase its autonomy in the water
- **Pechdauphir**: embarkation on filleters and bolincheurs in Finistère to test reflectors and interactive and repulsive pingers
- **OBSCAME**: installation of cameras on board filleters to better detect catches and understand interactions
- **OBSenPECHE**: reporting of marine mammal sightings and catches in a dedicated geo-referenced application to better understand interactions
- **Apocado**: study of interactions between common dolphins and fishing nets using acoustic recorders attached to fishing nets to record the underwater landscape and the reaction of animals in the water
- **Delmoges**: providing new knowledge to better understand the increase in bycatch and identify sustainable and feasible solutions for the profession





Current projects in the Bay of Biscay

Projects involving fisheries professionals in Spain

- **MITICET**: Onboard tests on two bottom trawlers to test the effectiveness of DDD-03H pingers in reducing bycatch of common dolphins in the Bay of Biscay.
- **MERMA CIFRA**: Monitoring, Evaluation and Reduction of the Accidental Mortality of Cetaceans due to Interactions with the Spanish Fleet - Review and Action underwater acoustic monitoring.
- **Descarse!**: Study measures to reduce the capture of non-target species, and other unwanted captures, analysing the characteristics of the nets, and the behaviour and vitality of the fish in the experimental nets, providing them with escape routes.
- **AHUYEMAR**: Development of innovative methodologies to avoid the interaction of marine mammals with seine nets during fishing activity in the NW Cantabrian National Fishing Ground.
- **VIRADA**: Bases for the reduction of bycatch mortality in the fishing gear of the harbour porpoise (*Phocoena phocoena*) and the bottlenose dolphin (*Tursiops truncatus*) in Natura 2000 areas of Galicia
- **Pingers and CED tests by Spanish Institute of Oceanography**





Current projects in the Bay of Biscay along the Iberian coasts

Projects involving fisheries professionals in Portugal

- **SafeSea**: The aim was to reduce the incidental capture of cetaceans and raise public awareness on sustainable development issues in the local fisheries. Activities predicted were: evaluation of the status of small cetacean populations on the Portuguese coast; evaluation of fisheries and cetacean interactions; implementation and testing of mitigations measures proposed; awareness raising campaigns. Finished in 2011.
- **LIFE + MarPro**: Monitoring of NATURA sites, proposal of new NATURA sites, implementation of management/conservation plans for harbour porpoises, bottlenose dolphins and Balearic shearwater, work on sustainable development of Portuguese fisheries with a reduced impact on target cetaceans and seabirds. Finished in 2017.
- **iNOVPESCA**: The aim was to reduce the accidental bycatch of marine protected species in coastal fisheries of Algarve (south Portugal). Activities included: collection of data in targeted fisheries, with interviews and onboard observers; stakeholder engagement and collaboration; monitoring of mitigation trials on each fisheries. Finished in 2021.



